EFFECTS OF FARMERS' RISK ATTITUDES AND PERSONALITY TYPES ON PRODUCTION AND MARKETING DECISIONS

by
Pei Xu, Purdue University
Corinne Alexander, Purdue University
George Patrick, Purdue University
Wesley Musser, University of Maryland

Staff Paper # 05-10

August 2005

Department of Agricultural Economics

Purdue University

EFFECTS OF FARMERS' RISK ATTITUDES AND PERSONALITY TYPES ON PRODUCTION AND MARKETING DECISIONS

by
Pei Xu
Corinne Alexander
George Patrick
Wesley Musser
Department of Agricultural Economics, Purdue University
West Lafayette, Indiana 47907-2056
cealexan@purdue.edu
Staff Paper # 05-10
August 2005

Abstract

Producers' risk perceptions, as well as their empirical measurement, have been an on-going concern for agricultural economists. Identification and categorization of producers' risk attitudes is important in both research and extension contexts. This study explores some alternative measures of farmers' attitudes and their relationships with observed producer behavior. The effect of farmers' personality types, as derived from the Myers-Briggs personality type indicator test, on marketing behavior is also explored.

There were positive and statistically significant correlations of producers' risk attitudes in various areas of the farm business. However, there are also some differences in producers' willingness to risk, especially in the finance area. Although a number of variables were statistically significant, farm operator characteristics, characteristics of the farm operation and risk attitudes of the farm operator had little effect on measures of behavior thought to involve risk/return trade-offs. The Myers-Briggs personality types were used in an analysis of marketing behavior that focused on marketing tools other than the spot (cash) market. Although some of the personality types had significant effects, there were often differences between the marketing behavior associated with corn and soybeans.

Keywords: Risk attitudes, risk perceptions, economic behavior, production, marketing, and Myers-Briggs type indicator,

EFFECTS OF FARMERS' RISK ATTITUDES AND PERSONALITY TYPES ON PRODUCTION AND MARKETING DECISIONS

by
Pei Xu, Purdue University
Corinne Alexander, Purdue University
George Patrick, Purdue University
Wesley Musser, University of Maryland

Producers' risk perceptions and risk attitudes, as well as their empirical measurement, have intrigued agricultural economists for many years. Many of the initial studies to derive producers' utility functions were conducted in developing countries. Young reviewed many of these studies, raising concerns with respect to the accuracy and reliability of the methods used. Additional studies to derive utility functions have been conducted in the U.S. (Halter and Mason), Australia (Bond and Wonder), and Canada (Gunjal and Legault). Whittaker and Winter re-interviewed the same producers initially studied by Halter and Mason, finding changes in risk preferences over time and very different relationships with socioeconomic characteristics. However, Collins, Musser, and Mason found that a prospect theory interpretation, relating changes in risk attitudes to changes in gross income, provided a more consistent interpretation of the two studies. Although it is commonly assumed the individuals are risk averse, Gunjal and Legault found that about 20 percent of producers were risk-preferring, even when presented with the opportunity to revise their risk preferences in a Delphi-type procedure. The percentage of risk-preferring individuals was similar to a number of other studies.

Identification and categorization of producers' risk attitudes continues to be important in both research and extension contexts. In his review, Young suggested the use of simpler intuitive measures of risk preferences and analysis of relationships with socioeconomic characteristics as useful lines of inquiry. Musser and Musser suggested that psychological measurement scales may provide a means of avoiding some of the limitations associated with previous empirical methods used in agricultural economics research. Patrick, Musser, and Ortmann, following Ajzen and Fishbein, explored the use of Likert-type scales to measure producers' willingness, relative to other farmers, to take risks in several management areas. They found producers' willingness to take risk in different management areas tended to be highly correlated, and there were also significant relationships between the producer's self-assessed skill in a management area and their willingness to take risk in that area. Kogan and Wallach used an individual's choices on real life choice dilemmas to develop a scale of a willingness of an individual to assume risk. Patrick, Musser, and Ortman used this choice dilemma approach and an adaptation to agricultural situations with groups of producers participating in the Top Farmer Crop Workshop. They found that there was no statistically significant difference between groups for the mean scores on the two scales. Age and debt/asset ratio were positively correlated with scores on the choice dilemmas scale (indicating less willingness to assume risk), while education and net worth were negatively correlated.

This paper summarizes a series of related research projects dealing with alternative measures of farmers' risk attitude and their relationships with producer behavior. It also reports farmers' personality types, as derived from the Myers-Briggs personality type indicator test, and how farmers' personality types affect their marketing behavior. All of the studies involve participants in the Top Farmer Crop Workshops. These three-day workshops are held annually at

Purdue University and provide producers with an update on the latest developments in crop economics and technology. In addition, producers have the opportunity to analyze potential changes in their own farm operation using a linear programming model. Participants in the workshops come primarily from the eastern Corn Belt and tend to be large-scale farmers who are younger and more highly educated than the general population of farmers.

The 1991 survey (Ortmann, Patrick, Musser, and Doster) involved Likert-type scales of the producers' self-assessment of their willingness to take risk relative to other farmers, traditional and agricultural choice dilemmas, and sources of and responses to risk. The 1993 survey (Patrick and Musser; Musser, Patrick and Eckman) used the Likert-type scales, directly elicited risk premiums for corn and soybeans, sources of and responses to risk, and producers' agreement or disagreement with selected risk-related statements. The 1993 participants also provided responses to an open-ended question with respect to what they considered risk in their farm operation (Patrick, Musser and Ortmann). While at the 1993 workshop, many of the participants completed the Myers-Briggs Type Indicator (Briggs-Myers) and indicated their personality type on one of the questionnaires completed at the workshop. The 1994 survey (Eckman, Patrick and Musser) included the Likert-type willingness to take risk scales, risk premiums, and agreement or disagreement with the series of risk-related statements. The questionnaires for all three years included information on the socioeconomic characteristics of the farm operator and farm operation. In addition, information was obtained on a series of production and marketing practices reflecting behavior which were presumed to be associated with risk attitudes.

This paper is divided into five sections. First, producers' agreement or disagreement with a series of statements associated with risk attitudes are briefly described. Second, the relative willingness to take risk by management area is summarized and correlations among these measures are presented. Third, the effects of socioeconomic characteristics of farm operators and farm operation on selected measures of performance which are presumed to be related to risk attitudes are reported. Fourth, censored regression equations are estimated to determine the effects of characteristics of the farm operation and the farmer's personality type on the farms' marketing behavior in 1992 and 1993. The final section draws conclusions based on these related studies and makes recommendations for further research.

Risk Attitude Related Statements

Producers were asked to indicate their agreement or disagreement with a series of risk attitude related statements on a scale of 1 (strongly agree) to 5 (strongly disagree). Table 1 summarizes the percentages of participants in the 1993 and 1994 surveys who chose each level of agreement or disagreement for each risk attitude statement as well as the overall average rating of each statement. Statement 1 – "I regard myself as the kind of person who is more willing to take a few more risks than others." had over 60% of the producers indicating agreement or strong agreement. Only about 12% of respondents indicated disagreement with the statement. Statement 2 – "I must be willing to take a number of risks to be successful." had more than 70% of producers indicating agreement or strong agreement. These responses indicate that the majority of those who participated in the Workshop regarded themselves as the kind of person who are willing to take risks.

Statement 3 – "I am generally cautious about accepting new ideas." and Statement 4 – "I am reluctant about adopting new ways of doing things until I see them working for the people

around me." are less directly linked to risk attitudes. In contrast to statements 1 and 2, respondents tended to disagree with statements 3 and 4. However, farmers in both years indicated greater disagreement with statement 4 as indicated by the higher average response values.

Statement 5 - "I am more concerned about large loss in my farm operation than missing a substantial gain." was intended to reflect a different aspect of risk attitudes. Although the expected values of two alternatives are identical, prospect theory suggests that decision makers generally avoid alternatives involving large losses. In 1993, 11.9% of participants strongly agreed with the statement and 34.3% agreed. More farmers in 1994, 24.4% strongly agreed with the statement and 26.4% agreed.

Although no statistical tests were performed, the mean values of responses for all five of the risk attitude related statements were lower in 1994 than in 1993. There was extensive flooding of the Mississippi River and excessive moisture in 1993 which may have lead to more awareness of the possibilities of loss, the need to take risk in order to get ahead and greater concern about the possibilities of large losses.

Relative Willingness to Take Risk by Management Areas

The survey questionnaires in all three years, 1991, 1993 and 1994, asked respondents to indicate their willingness to take risk, relative to other farmers, in four management areas: farm production, product marketing, farm finance, and overall management. A Likert-type scale with 1 indicating much less willingness to take risk and 5 much more willingness to take risk was used. The inclusion of the overall management scale reflects the proposition in attitude theory that specific attitudes predict specific behavior while more general attitudes predict general behavior. (Patrick, Musser, Ortmann, 1991). Based on this proposition, the first three scales would be more closely related to risk responses in the traditional areas of farm management, and the fourth with responses in overall farm management. A variable called RISK is defined as the average of the responses in farm production, product marketing and farm finance areas.

Sample statistics for the five scales are presented in Table 2. Farmers expressed the highest willingness to take risk in the production area (mean values are 3.7 in 1991, 3.8 in 1993 and 3.7 in 1994), and the lowest willingness to take risk in the farm finance area (mean value of 3.2 for each of the three survey years). About 72.8% of the 66 participants in 1993 showed high willingness to take risk (responses of 4 or 5) in farm production. A majority of farmers also expressed high willingness to take risk (responses of 4 or 5) in farm product marketing in each of the three years. However, only 37.8% showed a high willingness to take risk in the farm finance area.

The RISK variable describes the sum of the willingness to take risk in the above three management areas divided by three. Some 41.9% of the 62 respondents in 1991 averaged a 4 on the RISK measure expressing that they were risk preferring rather than risk averting. Farmers' were less willing to take risk in 1993 compared with 1991 as only 25.8% averaged a 4 on RISK measure. The mean of the RISK variable was 3.5 in all three years.

All of the willingness to take risk measures are positively correlated at statistically significant levels (Table 3). In 1991, the highest correlation, 0.865, was between RISK and farm product marketing, as well as between RISK and overall management. The lowest, 0.394, was

between farm finance and farm production. The above correlations were all significant at the one percent level. In 1993, the highest correlation, 0.765 was between the RISK measure and farm marketing, as well as between RISK measure and farm finance. Similar to 1991, the lowest correlation in 1993, 0.226, was between farm finance and farm production. In year 1994, the highest correlation, 0.828, was between the RISK measure and farm finance. The lowest correlation, 0.314, was between overall management and farm finance, but it was statistically significant at the five percent level.

The positive and statistically significant correlations indicate that producers' risk attitudes in various areas of the farm business tend to be similar. However, there are also some differences in producers' willingness to take risk, especially in the finance area. Not surprisingly, the highest correlations are between the overall willingness to take risk and RISK which is an average of responses in the three functional areas.

Effects of Operator Characteristics and Risk Attitudes on Measures of Performance

Do the characteristics of farm operators and their risk attitudes affect selected measures of performance? To attempt to gain understanding of this area, eight selected measures of performance were used as the dependent variable in a regression model with the characteristics of farm operators and their risk attitudes as explanatory variables. The selected dependent variables are measures of performance which involve risk/reward trade-offs.

The measures of performance include the percentage of corn acres planted to full season corn, (FSEASON). Full season corn varieties typically have higher yields than shorter maturity varieties, but may be hurt by an early frost or have significantly higher drying costs. The maximum percentage of corn side-dressed, (SIDEDR), reflects the trade-off between more efficient use of nitrogen fertilizer, but with the possibility that wet conditions may preclude the application of the needed nitrogen. The number of good field days needed to plant corn and single crop soybeans, (PLANT), involves a trade-off between the costs associated with larger machinery and higher yields related to earlier planting. The total number of corn hybrid varieties grown, (HYBRID), involves a potential trade-off between diversification of varieties and top yields. The percentage of corn acreage in new varieties, (NEWHYB), involves the trade-off between genetic improvement of new varieties and proven ability of established varieties to perform under a range of growing conditions. The maximum percentages of expected corn and soybeans production priced before August 1, (MAXCORN) and (MAXBEAN), involves the potential trade-off between establishing a price and the risk of not producing enough corn or soybeans to fulfill the contract. The number of good field days to harvest corn and soybeans, (HARVEST), involves a trade-off between machinery costs and crop losses associated with untimely harvest.

Based on previous research, a number of independent variables were included. The farm operator was reflected by age, AGE, and education, EDUC. The farm operation was reflected by the total number of crop acres, CROP, debt/asset ratio of the farm business, D/A, and combined net worth of the farm operator and spouse, NETW. Other risk related variables chosen as explanatory variables included Statements 1 and 5 from Table 1, referred to as RA1 and RA5, respectively. Willingness to take risk in overall farm management, ROVER was included. Finally, the farmer's self-assessed management skills in overall farm management, MOVER. Means and standard deviations of the independent variables are presented in Table 4.

The regression results are presented in Table 5. The estimated regressions have substantial differences in statistical significance. The R^2 s of the estimated equations range from 0.04 to 0.29, and only a limited number of statistically significant coefficients were found. For the percentage of corn acres planted to full season corn varieties, none of the variables were statistically significant at generally accepted levels. Furthermore, although the coefficients were not significant, there were a number of sign reversals between the 1993 and 1994 results. For 1993, the two variables significant at five percent level in the maximum percentage of corn side-dressed regression were total crop acres and the debt/asset ratio. There was a negative relationship between the total crop acres and the maximum percentage of corn side-dressed indicates that the more total acres in the farm operation, the smaller percentage of corn to be side-dressed. Crop acres were also negative in 1994, but not statistically significant. The positive coefficients for the debt/asset ratio variable in 1993 and 1994 indicates that the more debt the farm had the larger the percentage of corn to be side-dressed, but only the 1993 coefficient was statistically significant. Education had negative coefficients in both 1993 and 1994, but only the 1994 coefficient was statistically significant.

It is sometimes suggested that farmers should be able to plant their corn and single crop soybeans in 10-12 good field days. Education had a positive and significant effect on the number of good field days needed to plant corn and single crop soybeans for both 1993 and 1994, suggesting that more highly educated farmers tended to have longer planting periods. Overall management skill also was statistically significant in both 1993 and 1994. However, the coefficient was positive in 1993 and negative in 1994. None of the other independent variables had statistically significant effects in either year.

The total number of corn hybrid varieties planted in year 1994 had a negative relationship with age and a positive relationship with debt to asset ratio indicating that older farmers grow fewer hybrid corn varieties, but farmers who have higher debt are more likely to grow more hybrid corn varieties. None of the independent variables analyzed were statistically significant in 1993 and the overall explanatory power of the model was very limited.

Statistical results relating to the percentage of corn acreage in new varieties were generally weak. However, risk statement 5 (RA5), dealing with avoiding large losses, is the only variable that was significant at a ten percent level for the percentage of new variety corn acreage regression.

Results are mixed on the maximum percentages of expected corn and soybeans priced before August 1. Overall management skill was positive and statistically significant in 1993, suggesting the producers that considered themselves as better managers priced substantially more corn and soybeans before August 1. However, although not statistically significant, overall management skill had a negative impact on pricing in 1994 for both corn and soybeans. As noted previously, the flooding and excessive moisture in 1993 had major effects on many producers. Perhaps producers also underwent changes in their risk perceptions between 1993 and 1994. RA1 and RA2 had negative coefficients for both corn and soybeans in 1993 and 3 of the 4 coefficients were statistically significant effects. Although 3 of the 4 coefficients continued to be negative in 1994, none were significant. Higher debt/asset ratios were associated with higher levels of forward pricing both corn and soybeans in 1993. The debt/asset ratio continued

to have a positive effect on forward pricing of both corn and soybeans in 1994, but estimated coefficients were not statistically significant.

Another measure of behavior was the number of good field days needed to harvest corn and soybeans. Both overall management and the debt to asset ratio had positive and statistically significant impacts on the good field days needed in 1993, but were negative in 1994. None of the other variables included in the analysis were significant in either 1993 or 1994.

The final measure of behavior considered was the debt/asset ratio of the farm firm. This was the only financial behavior measure considered and was based on the mid-point of the specified category checked by the respondent. For 1993, only net worth, which had a negative coefficient, was statistically significant. For the 1994 debt/asset ratio, only overall management skill, which had a negative effect, was statistically significant.

As noted previously, producers were asked to rate their willingness to take risk in the production, marketing, and finance areas as well as an overall measure. Producers were also asked to rate their management skills in these areas. A series of regressions were estimated for the various measures of behavior using the willingness to take risk and management skills most closely associated with the area of behavior. It was hypothesized that more specific measures of willingness to take risks and management skills would be more closely associated behavior in the specific are. There was very limited support for this hypothesis, and in some cases the more general measures were more closely associated with behavior than the more specific measures.

This analysis suggests that farm operator characteristics, characteristics of the farm operation, and risk attitudes of the farm operator have little effect on measures of behavior thought to involve risk/return trade-offs. These results may in part be due to errors in measurement of both the dependent and independent variables. It may be that these selected measures of behavior have only very limited association with risk attitudes and are affected primarily by factors not considered in this analysis. There may other facets of risk attitudes, which are not reflected in the measures used in this analysis, which are important in decision making.

Effects of Farmers' Characteristics and Personality Types on Marketing Behavior

Participants in the 1993 Top Farmer Crop Workshop took the Myers-Briggs Personality Type Indicator. These individuals were asked to indicate their personality type as they completed the 1993 survey. There were originally fifty-eight respondents who participated in the personality type test, but 7 were eliminated because of incomplete Myers-Briggs information. An additional 6 responses were eliminated as being multiple responses from a farm operation, a very small farm and 2 farms on which livestock represented more than 67% of gross income. Another five responses were eliminated because the respondent did not fill out the rest of the survey. There were forty usable responses for this portion of the study.

The definitions of the eight Myers-Briggs Type Indicators (MBTI) and the associated percentage of respondents in each type are presented in Table 6. Two MBTI subgroups or Keirseian Temperament factors (NT, SJ) (Keirsey and Bates) and one Myer-Briggs Personality Type (ISTJ) and the associated percentage of respondents in each group are presented in Table 7. Previous research has shown that farmers differ from the general population and has linked these

subgroups to marketing behavior. In a study of 500 farm couples, Horner and Barrett found that "The percentages in each category differed appreciable from those of the general population." In particular, they found that farmers were more likely to be introverted and judging than the general population (Suter, 1990). Similarly, Jose and Crumly found that the ISTJ subgroup is overrepresented in the agricultural population (23%) compared to the general population (5%). Jose and Crumly also found that NT's are more likely to use alternative marketing methods, while "SJs rejected these alternatives as speculative and risky." (p. 129).

These previous studies suggest that farmers' personality types may affect their marketing behavior and other farm management decisions. Four selected measures of marketing behavior were used as the dependent variable in a maximum likelihood Tobit regression model with the characteristics of farm operators, their risk attitudes and their MBTI as explanatory variables. In order to increase the number of observations, the regressions include marketing behavior in 1992 and in1993, both of which were elicited in the 1993 survey. A dummy variable is included for marketing decisions in 1993.

The measures of marketing behavior focus on marketing tools other than the spot (cash) market. The measures are based on the number of bushels of corn and soybeans marketed with the following tools: a forward contract at the local elevator, a futures contract, and a futures options contract. The share of total grain that is marketed pre-harvest measures the intensity of use of these four marketing tools. The maximum expected percentage of grain sold before August 1 involves the potential trade-off between establishing a price and the risk of not producing enough corn or soybeans to fulfill the contract.

Based on previous research, the independent variables include the farm operation characteristics used in the previous regressions and described in Table 4. Three different sets of farmer personality type are also included. First, dummy variables are included if the farmer is introverted (I=1, E=0), sensing (S=1, N=0), and judging (J=1, P=0). The thinking/feeling pair is not included because there is only one respondent identified as F. Second, the two Keirseian Temperament factors (NT and SJ) that have been shown to be linked to marketing behavior are included. Third, the most common farmer personality type (ISTJ) is included.

The summary results of the regression of the number of bushels priced using a forward contract based on the explanatory variables on farm operation and farmers' personality type are reported in Table 8 of corn and Table 9 for soybeans. Total acres in the operation (CROP) is the only explanatory variable that was consistent in all of the models, at the 10 percent level in the base model for corn and at the one percent level in the rest of the corn and soybean models. Larger farms have a larger total number of bushels to market and they price more bushels of corn and soybeans using forward contracts compared to smaller farms. For all the soybeans regressions, except for the model with I, S, and J, a farmer's net worth was significantly and negatively correlated with the number of bushels of soybeans priced with a forward contract. Farmers with a lower net worth are less bear to bear risk and are more likely to diversify their pricing tools for soybeans in order to minimize soybeans price volatility. While none of the personality types are significant for soybeans, one personality type was significant for corn. Farmers with the ISTJ personality type were significantly more likely to price corn using forward contracts.

Hedging involves using the futures market to lock in a price. The advantage of hedging is that farmers get protection from a declining market price. The results of the regression of the

number of bushels hedged using a futures contract with the farm operation and farmers' personality type as explanatory variables are reported in Table 10 for corn and Table 11 for soybeans. A significant, positive relationship between a farmer's overall management skills (MOVER) and hedging was found in almost all the corn and soybean regressions, with exception of the corn model with I, S, and J. Hedging is a more advanced marketing skill, and farmers who hedge rate themselves as more skillful relative to other farmers. The total acres variable (CROP) is significant in three of the four corn models, but none of the soybean models. Thus, larger farmers hedge more bushels of corn. One reason larger farmers may be more likely to hedge corn rather than soybeans is simply due to the difference in volume: an acre of corn produces two to three times as many bushels as an acre of soybeans. A relatively large farm, say 3,000 acres with a 50-50 corn-soybean rotation, will produce on the order of 240,000 bushels of corn and 90,000 bushels of soybeans. For this farm, a 5,000 bushel corn futures contact only accounts for 2% of the corn produced, while a 5,000 bushel soybean contract accounts for 5.5% of the soybeans produced. If a producer plans to hedge 8% of the crop, he would purchase 4 corn contracts, but could purchase only 1 soybeans contract. For the corn hedging regressions, several other variable are significant. Farmers with more years of schooling (EDUC) are significantly less likely to hedge, or at least to hedge fewer bushels, which contradicts previous research which has identified a positive relationship between education and hedging. Farmers who are more loss averse (RA5) are significantly less likely to hedge and one possible explanation is that these farmers may view hedging as risk-increasing rather than risk-reducing. Farmers were significantly more likely to hedge corn in 1993 than in 1992. Two sets of personality variables are significant in explaining hedging. Farmers who exhibit Kiersian temperaments, either NT or SJ, are significantly more likely to hedge. Introverted farmers (I) are more likely to hedge while sensing farmer (S) are less likely to hedge.

An option contract is a contract which gives the contract buyer the right to either buy or sell a specified futures contract at a contracted price. It provides farmers with a price risk management alternative for no potential loss, but with unlimited gain. The results of the regression of the number of bushels hedged using an options contract on the explanatory variables of farm operation and farmers' personality type are reported in Table 12 for corn and Table 13 for soybeans. None of the personality types are significant in explaining the use of options contracts in marketing corn or soybeans.

There is a significant, positive relationship between a farmer's overall management skills (MOVER) and use of option contracts in all the corn regressions. Three risk variables were significant in all four regressions explaining the use of options contracts in marketing corn: the risk preference variable (RA1), the debt to asset ratio (D/A) and combined net worth (NETW). All of the above variables are highly positively related to option contract variable at the five percent significance level or above. Thus, farmers who are willing to take more risk, who have a higher debt-asset ratio, or who had higher combined net worth with their spouse were more likely to use option contracts to price corn. Loss-aversion (RA5) was significantly and negatively related to the use of options related to the use of options contacts to price corn which contradicts the commonly held belief that options can be used to limit large losses. Being more willing to take risk relative to other farmers (ROVER) was significantly and negatively related to the use of options contracts to price corn. This is consistent with the belief that options can be used to reduce price risk.

For the regressions explaining the use of options contracts in pricing soybeans, only two variables were significant. The farmers were much more likely to use options contracts in 1992

than in 1993. As with corn, farmers who are more loss averse (RA5) were less likely to use options contracts to price soybeans.

Regardless of which marketing tools are used, pre-harvest pricing is an important price risk management strategy. The results of the regression of the percent of total production priced pre-harvest on the explanatory variable on farm operation and farmer's personality types are reported in Table 14 for corn and Table 15 for soybeans. For corn, farm size (CROP) was significantly and negatively related to percent pre-harvest priced which is consistent with the notion that farmers with smaller operations would behave as though they are more risk averse. Farmers who consider themselves as more likely to take risks were significantly more likely to price corn pre-harvest. Farmers with more management skills (MOVER) were significantly more likely to pre-harvest price soybeans. Farmers with a higher debt-to asset ratio (D/A) and a lower net worth (NETW) were significantly more likely pre-harvest price soybeans.

Several personality types are significantly related to pre-harvest pricing of corn and soybeans. Farmers of the sensing (S) personality type were significantly more likely to pre-harvest price corn and significantly less likely to pre-harvest price soybeans. Farmers of the ISTJ personality type were significantly less likely to pre-harvest price soybeans.

Conclusions

Data from three years' Top Farmer Crop Workshops were used to analyze farmers' risk attitudes and how they affect production and marketing decisions. Sixty-seven farmers in 1993 and 49 farmers in 1994 responded to five risk-related statements. Their responses indicated that they could better be described as risk-preferring instead of risk averse. About 70.1% of farmers surveyed in 1993 and 75.59% in 1994 agreed or strongly agreed that they were willing to take a number of risks to be successful. About 62.8% of farmers surveyed in 1993 and 65.4% in 1994 agreed or strongly agreed that they regarded themselves at the kind of person who were willing to take a few more risks than others.

Farmers surveyed at the 1994 workshop tended to be more risk averse than those surveyed in 1993 in farm production, perhaps reflecting the widespread flooding and excess rain which occurred in 1993. About 53.1% of the farmers were willing to take risk in 1994 in their farm production as compared with about 63.6% in year 1993. But in farm finance, farmers in 1994 survey showed a higher risk preference than those being surveyed in 1993.

Farmers' demographic and socioeconomic characteristics affected some farm production decisions. A strong negative relationship between age and the total number of corn hybrid varieties showed that older farmers use fewer varieties of hybrid corn. Farmers with more education used more days to plant in 1993. An interesting finding showed that more skilled managers tended to use less days to plant and harvest in 1993, but more days to plant and harvest in 1994.

Farmers' personality types had only limited influences on their pre-harvest marketing decisions for corn and soybeans. Although some personality types were significant for some marketing tools, there was not a consistent pattern of effects. For example, sensing-type farmers were significantly more likely to pre-harvest price corn, yet significantly less likely to pre-

harvest price soybeans. Similar results were observed with respect to characteristics of the farm operator and farm operation.

This study presented results and findings based on data collected from three years' Top Farmer Crop Workshops. The data were collected more than ten years ago and might not be a good source to predict current farmers' specific production and marketing behavior. However, farmers' risk attitudes and their personality types would not be expected to change much. The results from this study suggest that risk attitudes and personality types have only limited effects and farm production and marketing decisions. These results may be useful to further research undertaken in this area.

Table 1. Percentage of Top Farmer Crop Workshop Participants Indicating Agreement or Disagreement with Risk Related Statements and Mean Responses. (1993: n=67; 1994: n=49)

Agreement or Disagreement with Risk Related Statement (%)	Strongly Agree				Strongly Disagree	
Statements / Year	1	2	3	4	5	**Mean**
Statement 1[a]						
Year 93	20.9	41.9	25.4	8.9	2.9	2.3
Year 94	34.8	30.6	22.4	12.2	0.0	2.1
Statement 2[b]						
Year 93	28.3	41.8	22.5	5.9	1.5	2.1
Year 94	32.7	42.8	18.3	4.1	2.1	2.0
Statement 3[c]						
Year 93	1.6	22.3	22.3	40.4	13.4	3.4
Year 94	2.1	30.6	28.5	30.6	8.2	3.1
Statement 4[d]						
Year 93	0.0	11.9	24.0	41.8	22.3	3.8
Year 94	6.2	14.3	24.5	40.8	14.2	3.4
Statement 5[e]						
Year 93	11.9	34.3	32.8	16.6	4.4	2.7
Year 94	24.4	26.4	30.5	16.2	2.5	2.4

[a] Statement 1: "I regard myself as the kind of person who is willing to take a few more risks than others."

[b] Statement 2: "I must be willing to take a number of risks to be successful."

[c] Statement 3: "I am generally cautious about accepting new ideas."

[d] Statement 4: "I am reluctant about adopting new ways of doing things until I see them working for people around me."

[e] Statement 5: "I am more concerned about large loss in my farm operation than missing a substantial gain."

Table 2. Percentage of Top Farmer Crop Workshop Participants Indicating Relative Willingness to Take Risk by Management Area and Mean Responses.

(1991 n=62; 1993 n=66; 1994 n=49)

Management Areas and Year	Relative Willingness to Take Risk (%)					
	Much Less				Much More	Mean
	1	2	3	4	5	
Production						
Year 91	3.2	4.8	29.0	48.4	14.6	3.7
Year 93	1.5	3.0	22.7	63.6	9.2	3.8
Year 94	0.0	2.0	34.7	53.1	10.2	3.7
Marketing						
Year 91	3.2	11.3	30.6	41.9	12.9	3.5
Year 93	1.6	12.1	22.7	54.5	9.1	3.6
Year 94	0.0	6.1	38.7	44.9	10.2	3.6
Finance						
Year 91	4.8	24.2	25.8	33.9	11.3	3.2
Year 93	6.0	16.6	39.4	31.8	6.0	3.2
Year 94	0.0	28.6	28.7	32.7	10.2	3.2
Overall						
Year 91	1.6	9.7	30.6	48.4	9.7	3.6
Year 93	1.5	1.5	34.8	56.1	6.1	3.6
Year 94	0.0	10.2	40.8	42.9	6.1	3.5
RISK[a]						
Year 91	3.2	8.1	38.7	41.9	8.1	3.5
Year 93	1.5	10.6	60.6	25.8	1.5	3.5
Year 94	0.0	12.2	53.1	32.7	2.0	3.5

[a]: RISK is the sum of the responses in farm production, product marketing and farm finance divided by 3. For example, if a respondent chose 2 in farm operation, 3 in product marketing and 1 in finance, then the value for RISK = (2+3+1)/3= 6/3=2.

Table 3. Correlations among Measures of Relative Willingness to Take Risk of Top Farm Workshop Participants.
(1991 n=62; 1993 n=66; 1994 n=49)

	Relative Willingness to Take Risk				
	Production	**Marketing**	**Finance**	**Overall**	**RISK[a]**
Production					
Year 91	1.000	0.593***[b]	0.394***	0.760***	0.776***
Year 93	1.000	0.320***	0.226*[d]	0.587***	0.648***
Year 94	1.000	0.499***	0.383***	0.497***	0.742***
Marketing					
Year 91	-	1.000	0.562***	0.729***	0.865***
Year 93	-	1.000	0.344***	0.526***	0.765***
Year 94	-	1.000	0.463***	0.610***	0.805***
Finance					
Year 91	-	-	1.000	0.642***	0.857***
Year 93	-	-	1.000	0.535***	0.765***
Year 94	-	-	1.000	0.314**[c]	0.828***
Overall					
Year 91	-	-	-	1.000	0.865***
Year 93	-	-	-	1.000	0.746***
Year 94	-	-	-	1.000	0.574***

[a]: RISK is defined in Table 2.
[b]: *** indicates correlation is significantly different from 0 at the 1% statistic level;
[c]: ** indicates correlation is significantly different from 0 at the 5% statistic level;
[d]: * indicates correlation is significantly different from 0 at the 10% statistic level.

Table 4. Definitions of Risk Related Explanatory Variables for 1993 Top Farm Crop Workshop Participants.

Name	Definition	Mean	Standard Deviation
CROP	Number of crop acres the farm business operates. It was defined as the sum of the acres owned, share leased, cash rented and custom farmed.	1992.00	1223.00
AGE	Age of the operator in years	39.36	9.76
Rating of RA1	"I regard myself as the kind of person who is willing to take a few more risks than others". On 5-point Likert-type scale.	2.31	1.02
Rating of RA5	"I am more concerned about large loss in my farm operation than missing a substantial gain." On 5-point Likert-type scale.	2.65	1.04
ROVER	Overall willingness to take risk relative to other farmers. On 5-point Likert-type scale.	3.65	0.70
MOVER	Overall farm management skills relative to other farmers. On 5-point Likert-type scale.	4.03	0.56
D/A	Debt to asset ratio of the farm business.	34.23	20.31
NETW	Owner and spouse's combined net worth.	695.07	605.28

Table 5. Effects of Socioeconomic Characteristics of Farm Operators and Their Risk Attitudes on Selected Measures of Performance.

(1993 n=64; 1994 n=47)

Year	Explanatory Variables[2]	Percentage of Corn Acres Planted to Full Season Corn (FSEASON)	Maximum Percentage of Corn to be Side-dressed (SIDEDR)	Good Field Days Needed to Plant Corn and Single Crop Soybeans (PLANT)	Total Numbers of Corn Hybrid Varieties Grown (HYBRID)
Year 93	*AGE*	-0.577	0.322	-0.077	-0.065
Year 94		0.108	-0.737	-0.093	-0.155**
Year 93	*EDUC*	1.980	-0.304	0.728** [b]	0.420
Year 94		0.398	-6.595*[c]	0.896**	-0.117
Year 93	*CROP*	0.000	-0.010**	0.000	0.000
Year 94		-0.002	-0.012	0.000	0.000
Year 93	*RA1*[1]	-3.205	-6.118	-0.504	-0.267
Year 94		2.871	-7.279	0.121	0.551
Year 93	*RA5*[2]	-2.342	2.799	-0.621	-0.280
Year 94		2.672	6.230	0.158	-0.082
Year 93	*ROVER*	5.080	8.824	0.227	-0.690
Year 94		9.139	2.753	2.215	-0.474
Year 93	*MOVER*	0.186	-13.673	3.185***[a]	-0.100
Year 94		-4.510	-16.006	-2.778**	-0.506
Year 93	*D/A*	0.025	0.679**	0.016	-0.005
Year 94		-0.086	0.050	-0.058	0.060*
Year 93	*NETW*	-0.004	-0.002	-0.001	0.001
Year 94		0.001	0.015	0.000	0.001
Year 93	R^2	0.082	0.232	0.245	0.081
Year 94		0.058	0.261	0.295	0.234

1. The Likert-scale statement of risk attitude : "I regard myself as the kind of person who is willing to take a few more risks than others."
2. The Likert-scale statement of risk attitude: "I am more concerned about large loss in my farm operation than missing a substantial gain."

[a]: *** indicates coefficient is significantly different from 0 at the 1% statistic level;
[b]: ** indicates coefficient is significantly different from 0 at the 5% statistic level;
[c]: * indicates coefficient is significantly different from 0 at the 10% statistic level.

Table 5 (Cont.). Effects of Socioeconomic Characteristics of Farm Operators and Their Risk Attitudes on Selected Measures of Performance.
(1993 n=64; 1994 n=47)

Year	*Explanatory variables*	Percentage of Corn Acreage in New Varieties (NEWHYB)	Maximum Percentage of Expected Corn Production Priced before August 1 (MAXCORN)	Maximum Percentage of Expected Soybean Production Priced before August 1 (MAXBEAN)	Good Field Days to Harvest Corn and Soybeans (HARVEST)	Debt/Asset Ratio (D/A)
Year 93	*AGE*	0.084	-0.486	-0.325	-0.218	-0.037
Year 94		-0.166	-0.516	-0.609	-0.036	0.601
Year 93	*EDUC*	0.196	0.164	0.939	0.418	-0.096
Year 94		-0.438	-1.480	-1.545	0.776	-0.790
Year 93	*CROP*	0.000	0.000	-0.003	0.001	0.000
Year 94		0.000	0.008*[c]	0.004	0.004	0.005
Year 93	*RA1*[1]	0.391	-4.230	-5.764*	-0.158	3.643
Year 94		0.504	3.388	2.667	0.552	-3.724
Year 93	*RA5*[2]	2.530	-6.755**[b]	-5.316*	-2.510	-1.026
Year 94		4.393*	-3.061	-0.915	0.322	1.317
Year 93	*ROVER*	0.043	-5.120	-7.648	0.724	3.815
Year 94		1.976	0.481	1.786	4.684	3.166
Year 93	*MOVER*	1.224	22.670***[a]	14.545**	6.001**	-2.021
Year 94		-0.456	-0.426	-2.189	-3.048	-8.075*
Year 93	*D/A*	0.025	0.289*	0.386**	0.117*	NA
Year 94		-0.071	0.152	0.139	-0.136	NA
Year 93	*NETW*	0.001	0.000	-0.001	0.002	-0.014***
Year 94		0.000	0.004	0.008	0.002	-0.005
Year 93	R^2	0.041	0.288	0.275	0.249	0.215
Year 94		0.125	0.175	0.125	0.235	0.243

[1] The Likert-scale statement of risk attitude: "I regard myself as the kind of person who is willing to take a few more risks than others."

[2] The Likert-scale statement of risk attitude: "I am more concerned about large loss in my farm operation than missing a substantial gain."

[a]: *** indicates coefficient is significantly different from 0 at the 1% statistic level;
[b]: ** indicates coefficient is significantly different from 0 at the 5% statistic level;
[c]: * indicates coefficient is significantly different from 0 at the 10% statistic level.

Table 6. Definitions of the Personality Types and the Percentage of Participants of These Types in the 1993 Top Farm Crop Workshop.

Type	Definition *	Percentage of Participants of this Type
I	The introvert-oriented individual (I): • Concentrates on ideas • Pause and reflect before going into action • Seeks stimulation in the inner world and likes to study alone	64.7
E	The extravert-oriented individual (E): • Prefers those activities requiring action. • Recharges the battery by visiting with other people. • Seeks stimulation in the outer environment and often likes to 'party-party.'	35.3
S	The sensing-type manager (S): • Uses the senses--the eyes, the ears, the nose, and several others-- to ascertain certain specifics relative to a problem • A practical realistic person with the desire to work largely with present-day factual matters	68.6
N	The intuitive-type manager (N): • More interested in the meaning(s), the relationship(s), and the alternative(s) • The intuitive individual tends to be more insightful, more imaginative, and more creative	31.4
T	The thinking-type manager (T): • Likes to make decisions logically and objectively • Does not hesitate to think about and attempt to hook together cause-and-effect • Likes to weigh the data, include even the unpleasant facts, and analyze all of the evidence, seeking whatever truth exists	96.1
F	The feeling-type manager (F): • Person-oriented • Tends to be more tactful, appreciative, and sympathetic. • Most decisions are made only after first considering what is important to those persons with whom the feeling-type manager works and plays • Logical analyses are of lesser importance	3.9
J	The judging-type manager (J): • Likes to live in an orderly fashion • Likes to have everything fairly well anticipated or planned in advance.	64.7
P	The perceptive-type manager (P): • Likes to live spontaneously and in a more flexible world • Wants to keep the options open, often by delaying any final decision.	35.3

* Source: “Personality Type and the Modus Operandi- The 1990 Top Farmer Crop Workshop” Robert C. Suter

Table 7. Definition of Personality Type Related Explanatory Variables for 1993 Top Farm Crop Workshop Participants.

Type	Definition	Number of Participants of this Type Total Number = 51
NT	Intuitive (N) and Thinking (T): • Tends to be dreamers and prophets • Likes to make decisions logically and objectively	15
SJ	Sensing (S) and Judging (J): • Uses the senses to ascertain certain specifics • Likes to plan in advance	27
ISTJ	Introverts (I), sensing (S), intuitive (T) and judging (J): • Pause and reflect before going into action • Uses the senses to ascertain certain specifics • Like to make decision logically and objectively • Plan in advance	16

Table 8. Maximum-Likelihood Tobit Estimates of Models for Corn Priced Using Forward Contracts.

	Forward Contracted Corn[a]			
	Base Model	**Base Model With NT SJ**	**Base Model With ISTJ**	**Base Model With I S J**
Intercept	15051.0600	956.9086	-27899.2000	5294.2310
	(52218.9900)	(57130.3400)	(51716.1200)	(49611.8100)
CROP	10.2731*	15.3143***	15.3754***	15.6707***
	(5.5677)	(5.8828)	(5.5346)	(5.6688)
EDUC	-2427.4000	-1479.0200	-663.3750	-1747.9000
	(2259.6350)	(2302.2610)	(2213.9050)	(2133.6010)
RA 1	-5.4983	-2365.4300	-1073.6200	-5536.8100
	(4519.4160)	(4506.8040)	(4276.8010)	(4780.2990)
RA 5	-541.0250	-1990.0700	-1994.8700	-1572.4100
	(4334.9190)	(4227.8020)	(4097.5720)	(4092.1140)
ROVER	4568.6710	1487.1280	3114.7410	1566.6090
	(6023.6850)	(5903.6510)	(5690.4960)	(5710.2640)
MOVER	1339.1890	3512.7400	5158.6220	1122.0040
	(9964.2080)	(9688.8350)	(9355.9060)	(9423.7770)
D/A	311.7831	236.7384	249.9805	230.6479
	(203.1671)	(202.1718)	(195.2401)	(208.1842)
NETW	-1.8492	-5.9503	-7.2084	-6.4756
	(8.2396)	(8.4846)	(8.0667)	(8.2333)
Dummy	4353.8330	3876.2340	3360.0030	3780.2240
	(7108.7440)	(6928.0790)	(6781.1980)	(6672.4480)
NT		-2822.3700		
		(11291.1400)		
SJ		16676.6900		
		(12083.5700)		
ISTJ			24462.1900***	
			(8365.8340)	
I				10468.0800
				(7852.6920)
S				12476.0000
				(7862.5580)
J				11181.5600
				(9085.3350)
Scale Variable [b]	26513.4800	25566.5500	24872.0200	24669.3100
	(2624.4740)	(2523.3950)	(2458.9130)	(2454.3570)
Log Likelihood	564.6977	561.946	560.5499	560.7155
Number of Observations	70	70	70	70

[a] Asymptotical standard errors in parentheses. The *,**, and *** indicate coefficients asymptotically significant at 10,5, and 1 percent levels, respectively.

[b] Estimate of standard deviation.

Table 9. Maximum-Likelihood Tobit Estimates of Models for Soybeans Priced Using Forward Contracts

	Forward Contracted Soybeans [a]			
	Base Model	**Base Model With NT SJ**	**Base Model With ISTJ**	**Base Model With I S J**
Intercept	-12131.1000	-12491.4000	-15982.6000*	-13783.0000
	(9173.1460)	(10361.7800)	(9415.4310)	(9047.5720)
CROP	4.3260***	4.4279***	4.8642***	4.3878***
	(0.9856)	(1.1224)	(1.0389)	(1.0638)
EDUC	217.4951	234.2536	364.4847	331.1680
	(396.4103)	(417.4227)	(402.8963)	(390.6261)
RA 1	-132.6330	-165.0560	-199.8900	-130.4970
	(873.2748)	(904.7521)	(848.0530)	(918.7765)
RA 5	-92.9348	-94.4902	-129.1420	35.6411
	(818.1414)	(814.7697)	(792.4508)	(793.2481)
ROVER	-181.3750	-207.3160	-167.7710	123.0063
	(1057.4520)	(1066.7030)	(1034.4790)	(1056.9820)
MOVER	2389.6260	2396.7400	2535.5090	1760.1920
	(1768.0540)	(1781.2960)	(1717.7990)	(1755.9400)
D/A	47.5518	46.1983	41.4737	36.3431
	(33.7413)	(34.5825)	(33.4114)	(36.4024)
NETW	-2.6145*	-2.7155*	-3.2122**	-2.4828
	(1.4706)	(1.5728)	(1.4973)	(1.5140)
Dummy	-310.9360	-293.8960	-180.6240	-127.8220
	(1293.4800)	(1294.9400)	(1272.0850)	(1259.3190)
NT		12.2269		
		(2119.8100)		
SJ		302.9385		
		(2234.0820)		
ISTJ			2050.8390	
			(1525.2760)	
I				1729.4400
				(1402.7910)
S				1182.9770
				(1505.2490)
J				-1188.9100
				(1715.3510)
Scale Variable [b]	4603.9190	4599.4730	4515.5170	4473.2150
	(449.0088)	(449.0187)	(442.2399)	(438.5270)
Log Likelihood	487.4730	48.6084	486.5875	486.2705
Number of Observations	70	70	70	70

[a] Asymptotical standard errors in parentheses. The *,**, and *** indicate coefficients asymptotically significant at 10,5, and 1 percent levels, respectively.

[b] Estimate of standard deviation.

Table 10. Maximum-Likelihood Tobit Estimates of Models for Corn Hedged Using Futures Contracts

	Hedged Corn[a]			
	Base Model	**Base Model With NT SJ**	**Base Model With ISTJ**	**Base Model With I S J**
Intercept	41280.4300	19667.6400	34039.8500	56265.5000
	(41600.2500)	(33607.2200)	(43246.7900)	(43658.1200)
CROP	7.8147*	9.4416**	8.3405*	0.6847
	(4.3169)	(3.9834)	(4.3757)	(5.6140)
EDUC	-3567.4100*	-4869.9600***	-3345.2500*	-3737.5400*
	(1954.7310)	(1659.2310)	(1991.0230)	(1841.4570)
RA 1	3667.4400	2566.4460	2984.9890	3613.6030
	(3613.0710)	(3054.8480)	(3655.7320)	(5300.9290)
RA 5	-4760.5400*	-6948.0300***	-4765.4400*	-5189.5700**
	(2565.7220)	(2208.9360)	(2501.1150)	(2437.4880)
ROVER	1781.8060	98.1707	1945.6020	3762.6710
	(4259.3380)	(3576.9450)	(4278.5040)	(6229.5390)
MOVER	9534.3860*	17734.3900***	10372.1100*	8344.7050
	(5496.0450)	(4553.0470)	(5558.5990)	(10515.3900)
D/A	-195.8790	-106.8740	-203.3450	-24.8434
	(160.0807)	(125.5722)	(160.3796)	(158.2651)
NETW	-7.2678	-9.0886*	-9.0076	-0.3055
	(5.7700)	(5.1655)	(6.2800)	(8.4425)
Dummy	11048.9000**	10798.3000***	10924.2000**	13061.5000***
	(4981.9850)	(3970.2900)	(4944.4170)	(4648.3960)
NT		23779.9800***		
		(5891.5360)		
SJ		16686.8900***		
		(6366.4930)		
ISTJ			4334.8960	
			(6430.4740)	
I				10030.4100*
				(5451.0410)
S				-16435.0000**
				(6455.5530)
J				-6616.6300
				(13632.6800)
Scale Variable [b]	11950.5100	9060.6420	11837.4900	10071.3000
	(1838.3080)	(1440.9580)	(1825.1420)	(1576.4030)
Log Likelihood	201.0437	195.2457	200.8176	196.0483
Number of Observations	70	70	70	70

[a] Asymptotical standard errors in parentheses. The *,**, and *** indicate coefficients asymptotically significant at 10,5, and 1 percent levels, respectively.

[b] Estimate of standard deviation.

Table 11. Maximum-Likelihood Tobit Estimates of Models for Soybeans Hedged Using Futures Contracts

	Hedged Soybeans[a]			
	Base Model	**Base Model With NT SJ**	**Base Model With ISTJ**	**Base Model With I S J**
	-		-	-
Intercept	99757.8000**	-97164.5000*	103481.0000*	105623.0000**
	(47714.2100)	(50729.8200)	(48869.9800)	(49677.6000)
CROP	6.3474	6.7250	6.5890	7.7909
	(4.1347)	(4.5852)	(4.1426)	(5.1611)
EDUC	-1645.1300	-1652.5100	-1418.4700	-1429.5700
	(1897.7280)	(2026.9170)	(1977.2890)	(1905.2530)
RA 1	3375.3390	3593.9900	3334.1150	2288.3130
	(3907.3490)	(4179.7890)	(3872.6820)	(4826.1230)
RA 5	305.0454	244.9820	-74.8573	-668.5270
	(2891.7110)	(3505.9030)	(3063.0540)	(3239.2320)
ROVER	228.5250	230.8430	-22.3585	-1655.3800
	(5063.1840)	(5941.9710)	(5055.1140)	(6245.7690)
MOVER	16416.4600**	16001.8300*	16965.4000**	18445.5400**
	(7532.5180)	(8573.9850)	(7713.0120)	(9209.4370)
D/A	356.5083*	339.4695	340.6710	333.5120
	(213.4049)	(217.3739)	(213.8074)	(226.2897)
NETW	2.8704	2.9908	2.0535	0.7776
	(6.7891)	(7.1229)	(7.0620)	(7.4756)
Dummy	7933.7540	7880.2030	7822.5580	7834.9490
	(6091.7240)	(6096.8430)	(6022.3570)	(6025.7250)
NT		-2602.7700		
		(9762.2100)		
SJ		-827.6810		
		(11192.0400)		
ISTJ			2632.1110	
			(7821.1460)	
I				911.1065
				(7565.0060)
S				2405.3980
				(8342.3360)
J				5047.9880
				(10323.1200)
Scale Variable [b]	16462.0000	16469.6200	16292.3100	16249.7100
	(3517.1460)	(3524.9280)	(3503.8890)	(3489.1610)
Log Likelihood	171.2029	171.1606	171.1476	170.9883
Number of Observations	72	72	72	72

[a] Asymptotical standard errors in parentheses. The *,**, and *** indicate coefficients asymptotically significant at 10,5, and 1 percent levels, respectively.
[b] Estimate of standard deviation.

Table 12. Maximum-Likelihood Tobit Estimates of Models for Corn Priced Using Options Contracts

	Corn Priced with Options Contracts[a]			
	Base Model	**Base Model With NT SJ**	**Base Model With ISTJ**	**Base Model With I S J**
Intercept	-14039.9000	-13965.7000	-8925.8800	-12344.4000
	(12134.4900)	(12131.4200)	(12698.3600)	(13724.6100)
CROP	-4.7433**	-5.1067**	-4.4011**	-4.9386*
	(2.2621)	(2.1002)	(2.1986)	(2.8619)
EDUC	-535.5020	-631.4100	-611.6650	-901.7090
	(567.7877)	(610.3481)	(586.3341)	(706.9811)
RA 1	6490.9340***	6386.7450***	5943.6660***	5754.1860***
	(1692.1330)	(1799.6490)	(1891.8590)	(2098.3650)
RA 5	-1759.9*	-1293.0300	-1840.0400*	-1164.1100
	(957.7391)	(993.7311)	(997.0629)	(1103.8730)
ROVER	-2656.22**	-2315.4900	-2227.2100	-3210.6000**
	(1337.8730)	(1615.4210)	(1405.3670)	(1572.6670)
MOVER	7148.4980***	6804.4440**	5999.5510**	8381.0740**
	(2474.8650)	(2878.1920)	(2735.6600)	(2741.2360)
D/A	144.3217**	168.7235**	141.5791**	222.6366**
	(66.3763)	(85.0283)	(66.7202)	(87.5701)
NETW	11.0363***	11.5171***	11.6904***	11.3931***
	(3.1649)	(3.0542)	(3.0802)	(3.2910)
Dummy	1807.4700	2208.4890	2251.4270	2146.1380
	(1810.7250)	(1719.8730)	(1776.5350)	(1829.0190)
NT		1422.2210		
		(3281.7150)		
SJ		-1930.1300		
		(2803.3170)		
ISTJ			-2295.1500	
			(1850.4470)	
I				50.9361
				(2849.7620)
S				-4519.4000
				(3100.8260)
J				1548.5060
				(2573.8090)
Scale Variable [b]	3429.5580	3152.2690	3262.0600	3239.1610
	(695.8657)	(638.5880)	(654.6830)	(658.9800)
Log Likelihood	120.0691	118.6273	119.317	118.6637
Number of Observations	70	70	70	70

[a] Asymptotical standard errors in parentheses. The *,**, and *** indicate coefficients asymptotically significant at 10,5, and 1 percent levels, respectively.

[b] Estimate of standard deviation.

Table 13. Maximum-Likelihood Tobit Estimates of Models for Soybeans Priced Using Options Contracts

	Soybeans Priced with Option Contracts[a]			
	Base Model	**Base Model With NT SJ**	**Base Model With ISTJ**	**Base Model With I S J**
Intercept	15864.1500***	14983.1900	16490.6300***	10774.0100
	(5874.7600)	(9767.0700)	(5685.6510)	(58784.7500)
CROP	1.4877	-0.0465	1.5427	-0.0631
	(3.5734)	(4.3929)	(2.5861)	(12.2235)
EDUC	-765.3860	-629.0930	-806.9240	-407.8600
	(1060.8390)	(1123.3120)	(854.1557)	(2298.1280)
RA 1	-312.4620	146.3320	-363.3010	-13.6779
	(2699.5290)	(2418.8970)	(2085.2440)	(7305.3530)
RA 5	-1971.2100***	-1521.2600	-1886.4500***	-1593.1100
	(540.7770)	(1833.1080)	(652.9125)	(8384.4150)
ROVER	-1174.1500	-656.8630	-1269.6400	-1100.2300
	(1679.4280)	(1636.9910)	(1277.5060)	(7456.1250)
MOVER	2244.0680	2141.6440	2262.3000	2241.9370
	(3198.8220)	(3853.7050)	(2478.2780)	(8595.3350)
D/A	-12.7825	-31.4745	-12.5384	-0.8187
	(196.0542)	(155.9312)	(141.7143)	(501.6614)
NETW	1.6488	2.6599	1.8195	2.9520
	(9.7430)	(6.5191)	(7.1874)	(23.3424)
Dummy	-1428.8100*	-1442.0600*	-1416.8200*	-1442.1100*
	(802.7081)	(831.8089)	(803.2784)	(835.4173)
NT		-1916.7100		
		(7116.3700)		
SJ		-2989.0300		
		(5485.6090)		
ISTJ			-422.5350	
			(1980.2300)	
I				407.6310
				(11523.4700)
S				-268.2770
				(11136.8000)
J				-1483.5700
				(4556.6770)
Scale Variable [b]	974.2213	986.5210	971.1589	991.6146
	(227.3454)	(231.6289)	(225.7183)	(236.3895)
Log Likelihood	75.9089	75.7491	75.8901	75.735
Number of Observations	70	70	70	70

[a] Asymptotical standard errors in parentheses. The *,**, and *** indicate coefficients asymptotically significant at 10,5, and 1 percent levels, respectively.

[b] Estimate of standard deviation.

Table 14. Maximum-Likelihood Tobit Estimates of Models for Percent of Corn Priced Pre-Harvest

	Percent Corn Priced Pre-Harvest[a]			
	Base Model	**Base Model With NT SJ**	**Base Model With ISTJ**	**Base Model With I S J**
Intercept	0.2023	-0.4843	-0.4233	0.1867
	(1.0248)	(1.1179)	(1.0714)	(1.0419)
CROP	-0.0002*	-0.0002	-0.0002*	-0.0003*
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
EDUC	0.0026	0.0239	0.0142	0.018
	(0.0478)	(0.0488)	(0.0469)	(0.0479)
RA 1	0.1804*	0.1602*	0.1902**	0.2171**
	(0.0926)	(0.0936)	(0.0903)	(0.1034)
RA 5	0.0335	0.0168	0.0248	0.0227
	(0.0917)	(0.0912)	(0.0893)	(0.0903)
ROVER	-0.0390	-0.0924	-0.0828	-0.0376
	(0.1397)	(0.1407)	(0.1371)	(0.1398)
MOVER	0.1113	0.2059	0.2170	0.0630
	(0.2011)	(0.2089)	(0.2061)	(0.2043)
D/A	-0.0015	-0.0013	-0.0008	-0.0049
	(0.0046)	(0.0045)	(0.0045)	(0.0049)
NETW	------	-0.0001	------	------
	(0.0002)	(0.0002)	(0.0001)	(0.0002)
Dummy	0.0137	0.0053	0.0023	0.0065
	(0.1523)	(0.1507)	(0.1489)	(0.1493)
NT		0.1127		
		(0.2288)		
SJ		0.3718		
		(0.2463)		
ISTJ			0.2820	
			(0.1761)	
I				0.0277
				(0.1867)
S				0.3118*
				(0.1807)
J				-0.2366
				(0.2281)
Scale Variable [b]	0.5766	0.5666	0.5618	0.5624
	(0.0552)	(0.0544)	(0.0539)	(0.0540)
Log Likelihood	50.0320	48.6084	48.7856	48.4299
Number of Observations	72	72	72	72

[a] Asymptotical standard errors in parentheses. The *,**, and *** indicate coefficients asymptotically significant at 10,5, and 1 percent levels, respectively.

[b] Estimate of standard deviation.

Table 15. Maximum-Likelihood Tobit Estimates of Models for Percent of Soybeans Priced Pre-Harvest

	Percent Soybeans Priced Pre-Harvest[a]			
	Base Model	**Base Model With NT SJ**	**Base Model With ISTJ**	**Base Model With I S J**
Intercept	-0.5107	-0.2383	-0.1392	-0.4148
	(0.4171)	(0.4288)	(0.4360)	(0.4099)
CROP	0.0000	-0.0001	0.0000	-0.0001
	(0.0000)	(0.0000)	(0.0000)	(0.0001)
EDUC	0.0248	0.0113	0.0166	0.0145
	(0.0191)	(0.0186)	(0.0188)	(0.0183)
RA 1	0.0222	0.0321	0.0100	0.0083
	(0.0380)	(0.0358)	(0.0373)	(0.0386)
RA 5	0.0361	0.0449	0.0457	0.0304
	(0.0370)	(0.0346)	(0.0359)	(0.0347)
ROVER	-0.0561	-0.0445	-0.0443	-0.0589
	(0.0593)	(0.0570)	(0.0576)	(0.0556)
MOVER	0.1400*	0.1187	0.0917	0.1767**
	(0.0794)	(0.0779)	(0.0797)	(0.0755)
D/A	0.0034*	0.0036**	0.0032*	0.0050***
	(0.0018)	(0.0017)	(0.0017)	(0.0018)
NETW	-0.0001**	-0.0001*	-0.0001**	-0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Dummy	0.0340	0.0296	0.0375	0.0289
	(0.0626)	(0.0587)	(0.0602)	(0.0581)
NT		0.0941		
		(0.0878)		
SJ		-0.1178		
		(0.0924)		
ISTJ			-0.1609**	
			(0.0689)	
I				0.1105
				(0.0707)
S				-0.1754**
				(0.0714)
J				0.0205
				(0.0878)
Scale Variable [b]	0.2253	0.2098	0.2158	0.2087
	(0.0216)	(0.0201)	(0.0207)	(0.0201)
Log Likelihood	0.5888	3.2283	2.0408	3.1072
Number of Observations	72	72	72	72

[a] Asymptotical standard errors in parentheses. The *,**, and *** indicate coefficients asymptotically significant at 10,5, and 1 percent levels, respectively.

[b] Estimate of standard deviation.

References

Ajzen, I. and M. Fishbein, 1972, "Attitudes and Normative Beliefs as Factors Influencing Behavioral Intentions." *Journal of Personality and Social Psychology*, 21:1-9.

Bond, G. and B. Wonder, 1981, "Attitudes Towards Risk Amongst Australian Farmers: Reply," *Australian Journal of Agricultural Economics*, 26: 151-56.

Briggs Myers, I., (1984), *Introduction to Type*, Palo Alto: Consulting Psychologists Press, Inc.

Collins, A., W. N. Musser, and R. Mason, (1991).. "Prospect Theory and Risk Preferences of Oregon Seed Producers." *American Journal of Agricultural Economics*, 73 :429-35.

Eckman, D.T., G.F. Patrick and W.N. Musser, (1996), "Factors Affecting Written Marketing Plan Adoption by Large-Scale Grain Producers," *Review of Agricultural Economics*, 18: 565-574.

Gunjal, K. and B. Legault, 1995, "Risk Preferences of Dairy and Hog Producers in Quebec," *Canadian Journal of Agricultural Economics*, 43:23-35.

Halter, A.M. and R. Mason, 1978, "Utility Measurement for Those Who Need to Know," *Western Journal of Agricultural Economics*, 3: 99-109.

Horner, J.T., and L.A. Barrett, (1986), "Personality Types of 500 Farm Couple: Implications in Economic Crisis," Report presented at the Association for Psychological Type Conference, St. Paul, MN.

Jose, H.D. and J.A. Crumly, 1993, "Psychological Type of Farm/Ranch Operators: Relationship to Financial Measures," *Review of Agricultural Economics*, 15(1): 121-132.

Keirsey, D. and M. Bates, (1978), *Please Understand Me*, Third Edition, Del Mar; Prometheus Nemesis Books.

Kogan, N. and M.A. Wallach, 1967, "Risk Taking as a Function of the Situation, the Person and the Group," in *New Directions in Psychology III*, ed. R. Brown, New York: Holt, Rinehart and Winston.

Likert, R., (1932), "A Technique for the Measurement of Attitudes." *Archives of Psychology* 140: 5-55.

Musser, W.G. and L.M. Musser, 1984, "Psychological Perspective on Risk Analysis" in *Risk Management in Agriculture*, ed. P.J. Barry, Ames, Iowa: Iowa State University Press.

Musser, W.G., G.F. Patrick and D.T. Eckman, (1996), "Risk and Grain Marketing Behavior of Large-Scale Farmers," *Review of Agricultural Economics*, 18: 65-77.

Ortmann, G.F., G.F. Patrick, W.G. Musser and D.H. Doster, 1992. *Information Sources, Computer Use and Risk Management: Evidence from Leading Commercial Farmers*, Purdue University Agricultural Experiment Station Bulletin No. 638, June

Patrick, G.F. and W.N. Musser, 1997, "Sources of and Responses to Risks: Factor Analysis of Large-Scale U.S. Farmers," in *Risk Management Strategies in Agriculture: State of the Art and Future Perspectives*, ed. Hardaker, J.B., R. Huirne and A. Dijkhuizen, Wageningen Agricultural University Mansholt Studies Series No. 10, 45-54.

Patrick, G.F., W.G. Musser and G.F. Ortmann, 1993, "Risk Responses of Large-Scale Cornbelt Farmers," in *Quantifying Long Run Agricultural Risk and Evaluating Farmer Responses to Risk*, Department of Resource Economics and Policy, University of Maine, 81-117.

Suter, R.C., 1990, "Personality Type and the Modus Operandi-The 1990 Top Farmer Crop Workshop," *Proceedings of 1990 Top Farmer Crop Workshop*, Department of Agricultural Economics, Purdue University.

Whittaker, J.K. and J.R. Winter, 1980, "Risk Preferences of Farmers: An Empirical Example, Some Questions, and Suggestions for Future Research," in *Risk Analysis in Agriculture: Research and Educational Developments*, Illinois Agricultural Experiment Station AE-4492, 217-224.

Young, D.L., 1979 "Risk Preferences of Agricultural Producers: Their Use in Extension and Research," *American Journal of Agricultural Economics*, 61; 1063-70.